Sandia National Laboratories

Energy & Water Conservation Assessment Plan

June 2006

Table of Contents

1.0 INTRODUCTION

1.1 Purpose

Sandia's Facilities Management and Operations Center (FMOC) is responsible for strategic real property space management, disposition of excess property, acquisition of new property, sustaining existing assets in a fit-for-mission-use condition and applying sound energy and water conservation measures to all SNL facilities.

This attachment to the Facilities Energy Management Plan for Sandia National Laboratories (SNL) is designed to meet the requirements of DOE Order 430.2A, Attachment 1, Section 2.d. "*The energy management plan must exhibit and explain the application of the following requirements. (2) "Annual progress of at least 10 percent toward completing energy and water audits of all facilities, either through energy savings performance contracts or utilities energy efficiency service contracts or other means*."

1.2 Overview

Sandia National Laboratories (Sandia or SNL) is operated for the United States Department of Energy (DOE) by Sandia Corporation, a subsidiary of Lockheed Martin Corporation.

Sandia's physical infrastructure system supports a large workforce of Sandia employees, contractors, and visitors. Sandia's sites include the principal research and development campuses in New Mexico and California and testing facilities in New Mexico, Hawaii, and Nevada.

The facilities in New Mexico (SNL/NM) are located within the confines of Kirtland Air Force Base, south of the city of Albuquerque. They include five distinct zones known as technical areas, which are located on DOE-owned property; additional operations are located on lands permitted from other government agencies.

The California (SNL/CA) site is located on DOE-owned land in the city of Livermore, 40 miles east of San Francisco. The land is adjacent to the DOE's Lawrence Livermore National Laboratory.

The Hawaii (SNL/HI) site, also referred to as the Kauai Test Facility, is located on the west side of the island of Kauai, 135 miles northwest of Honolulu. The facility is located on the grounds of the U.S. Department of the Navy's Pacific Missile Range at Barking Sands.

The Nevada (SNL/NV) site is situated in the Tonopah Test Range (TTR), located on the northern portion of Nellis Air Force Base Range in Nye County, Nevada. The site is approximately 160 miles northwest of Las Vegas, Nevada, and is permitted to the DOE for Sandia's use under an operating agreement with Nellis Air Force Base.

Overall, Sandia's physical infrastructure includes approximately 344,800 acres of land and accommodates more than 800 government-owned buildings totaling more than 6.2 million gross square feet. In addition, Sandia leases approximately 197,000 square feet of space in off-site locations.

1.3 Responsible Parties The Manager, Mechanical, Electrical & Civil Engineering, 10863, is responsible for the implementation of the SNL Energy and Water Conservation Assessment Plan

2.0 ENERGY & WATER CONSERVATION ASSESSMENTS

2.1 Introduction This Energy & Water Conservation Assessment Schedule will follow the Condition Assessment Schedule currently being applied to all SNL Facilities. Condition Assessments are conducted on a five year cycle while Energy & Water Conservation Assessments are on a ten year cycle. Therefore, Energy & Water Conservation Assessments will be scheduled to coincide with Condition Assessment. It is the intent of this program to minimize disruption to day-to-day activities by combining these two assessment activities whenever possible.

2.2 Planning The manager in charge of Energy & Water Conservation Program will meet with the manager in charge of the Condition Assessment Program at the beginning of each year to review the facilities being assessed and coordinate schedules. Section 3.0 contains the proposed 10 year schedule for conducting Energy & Water Conservation Assessments for all applicable SNL facilities.

2.3 Performance These assessments will be performed by multidisciplinary teams or individuals or contractors using formal checklists (See Section 4.0) or other appropriate means. The results will be the initiation of Unresolved Facilities Needs (UFN) project request, Maintenance Service Request (MSR) or additional studies as appropriate.

3.0 ASSESSMENT SCHEDULE

A graded approach was utilized in the development of the assessment schedule. In order to most effectively apply resources, only facilities with the most opportunity for efficiency improvements are included. All buildings were reviewed for applicability to energy usage and potential for energy savings measures. The level of assessment rigor is reduced for smaller facilities (<500 ft ^2) such as MO's, T-Building's, Bunkers, Igloos, etc. Therefore, the following schedule lists those buildings that will be a part of the initial assessment by the teams. As data is gathered, further reductions in assessment scope are expected in order to focus efforts to the areas of greatest benefit.

3.1 FY-2005 Tech Area I – 12 Buildings:

807	849	851	865	867	874	875	8809
8810							

Tech Area II – 2 Buildings

958	959

Tech Area III – 19 Buildings

6501	6505	6523	6587	6631	6640	6710	6712	
6720	6736	6741	6910	6923	6925	6921	6926	6922H

TOTAL: 28 Buildings

3.2 FY-2006 Tech Area I – 13 Buildings:

803	806	810	831	832	884	8895	821A	8895B	T4
T42	T44	T46							

Tech Area II – 3 Buildings

918	919	920

Coyote Test Facility – 15 Buildings

9830	9831	9833	9946	9950	9957	9964	9965	9978	9982
9984	9970A	9970C	9980A	9981A					

SNL-LIVERMORE – 54 Buildings

C01	C07	C15	C904	C906	C907	C910	C911	C916	C9163
C920	C922	C925	C928	C940	C942	C955	C960	C9611	9621C
C9623	C96232	C9625	C9627	C962S3	C9631	C9633	C964	C966	C968
C970	C973	C974	C977	C9781	C981	C9821	C9823	C9825	C9827
C983	C9952	C9954	CBR2	CM22	CM24	CM28	CM30	CM44	CM46
CM47	CM51								

Total: 85 Buildings

3.3 FY-2007 Tech Area I – 12 Buildings:

605	827	835	836	857	890	833C	840A	847A	858K
858Z	860F								

Tech Area II – 2 Buildings

958	959

Tech Area IV – 10 Buildings

960	961	965	969	971	981	983	984	970A	6970

Total: 24 Buildings and 601,646 Square Feet

3.4 FY-2008 Tech Area I – 10 Buildings:

701	726	751	802	809	818	820	822	825	800A

Tech Area II – 40 Buildings

905	957	967	8862	6502D	6587Q	866B	870F	887B	887F
911A	928/1	928/3	928/5	928/7	953B	953D	953H	953J	953L
953N	953P	953T	953V	954C	954F	954J	954L	954N	954P
954R	954T	954V	954Y	957B	957D	958H	959D	959F	MB07

Tech Area V – 11 Buildings

6577	6580	6582	6586	6593	6595	6597	6580B	6580D	6580A
6590A									

Manzano – 1 Building

37570

TTR – 61 Buildings

03-34	03-38	03-40	15036	03-43	02-50	03-50	09-50	09-52	03-53
03-55	09-55	03-57	03-62	09-62	09-64	03-65	03-67	09-67	03-69
03-71	03-73	03-75	03-78	03-80	03-87	03-89	03-12	03-15	03-17
09-06	09-08	09-12	09-20	09-22	03-100	03-35B	03-35D	03-35F	03-35H
03-35K	03-35M	03-35P	03-36B	03-36F	03-36H	03-36K	03-36M	03-82T	03_84T
13-01	18-02	18-51	24-53	24-61	32-01	32-15	39-01	49-02	49-04
49-06									

Total: 123 Buildings

3.5 FY-2009 Tech Area I – 20 Buildings:

727	753	755	808	855	861	862	868	870	871
876	877	879	887	891	894	897	953	899A	952A

Tech Area III – 1 Building

MO248

KAUAI – 28 Buildings

B65	J1611	K601A	K643	K646	K648	K651	K656		
K659	K661	K668	K671	K673A	K675	K681	K686	KB28	KF33
KF35	KG1	KH10	KH3	KH9	KMO84	KMO86	KMO88	P-4-1	PAC-1

Total: 49 Buildings

3.6 FY-2010

Tech Area I – 6 Buildings

8864	851G	870C	884A	884C	980B

Tech Area III –43 Buildings

6518	6526	6527	6530	6531	6560	6570	6583	6584	6610
6620	6630	6635	6642	6650	6711	6715	6743	6750	6911
6920	6921	6922	6924	6926	6502C	6502S	6505A	6920G	

CALIFORNIA – 4 Buildings

6018	6028	6030	26017

Total: 53 Buildings

3.7 FY-2011

Tech Area I – 7 Buildings:

821	821B	831A	832A	T41	T43	T45

Coyote Test Facility – 18 Buildings

9832	9834	9849	9920	9925	9926	9930	9940	9949	9956
9960	9967	9972	9980	9981	9990	9940A	9970B		

Total: 25 Buildings

3.8 FY-2012

Tech Area I – 10 Buildings:

823	833	840	842	850	856	858	859	858G	858L

Tech Area IV – 10 Buildings

962	963	966	970	980	986	6969	961A	880D	960A

Total: 20 Buildings

3.9 FY-2013

Tech Area I – 11 Buildings:

700	725	750	800	801	804	811	819	826	829
807A									

Tech Area II – 4 Buildings

928	956	905G	957C

Tech Area V – 11 Buildings

6578	6581	6585	6588	6590	6591	6592	6594	6596	6580C
6585C									

TTR – 30 Buildings

03-45	03-51	09-51	03-54	09-54	09-56	09-58	09-60	09-63	03-64
03-68	03-70	03-74	03-77	03-79	03-88	03-20	09-15	03-101	03-81T
13-00	16-00	18-50	24-01	24-50	24-52	24-60	32-02	36-01	84-50

Total: 56 Buildings

3.10 FY-2014

Tech Area I – 22 Buildings:

752	864	869	872	878	880	885	886	888	890
892	895	897	899	952	954	870B	876A	880A	899A

952G	952T

KAUAI – 23 Buildings

B76	K1010	K615A	K645	K647	K648D	K652	K657	K660	K666C
K669	K673	K674	K680	K682	K687	KF25	KF34	KF4	KG7
KH17	KH8	P-4-2							

Total: 45 Buildings

4.0 ASSESSMENT CHECKLIST

Building # _____ Location_____ # of building occupants_____

Building GSF_____

Start Date: _____

Completion Date: _____

Individual(s) Conducting the Assessment: Mechanical:_____

Electrical:_____

Civil/ Water:_____ ___

Please send completed forms to: Miguel Atencio, 284-8002

Pre-Audit Review

1) Review energy usage data (if available):

Mechanical Data: FCS Reports using pre-defined trends

Electrical Data: Square D load profile report & 3 year electric use history report

Water Data: Building water consumption reports

2) Is there an unexpected fluctuation (jump/ drop) in the data? Explain.

3) Normal building operating hours from_____ to _____. Mon-Fri

4) Building Type: (Please circle)

Laboratory Office Combination Storage Other (Explain)

Electrical/ Lighting

Item	Check Point Description	Yes	No	N/A	Comments / Additional Information
1	Interior Lighting: (Please Circle) T-8 T-12				Location/ Qty
2	Exit signs: (Please Circle) LED Incandescent				Location/ Qty
3	Occupancy light sensor locations: Conference rooms Restrooms Other areas				Location/ Rm. #
4	Are lights turned off when unoccupied?				
5	Outdoor lighting off during daytime				
6	Lights off where day lighting available				
7	Light fixtures around skylights are turned off				
8	Network printers equipped with “green” (inactivity sensor/ power down) features?				
9	Office printers and other office loads equipped with “green” features?				
10	**Building Operator Questions**: Any special lighting needs or concerns?				
11	Are there any computer/ IDR rooms? If so, what schedule do they operate on?				

Item	Check Point Description	Yes	No	N/A	Comments / Additional Information
12	Outdoor lighting controlled automatically?				
13	Are there any refrigerators? Are they the new energy star versions or the older less efficient models? Are they all currently being used or could they consolidate to using only one refrigerator?				
14	List major energy consuming equipment in building:				
12	General Comments / Concerns:				

HVAC & Controls

Item	Check Point Description	Yes	No	N/A	Comments / Additional Information
	Thermostats set properly (For pneumatic thermostats, a year round setpoint of 73-74 F seems to work best)				
	Outside air dampers at minimum position (aside from economizer mode) for normal summer operating times				
	Outside air dampers operate properly				
	Air conditioning ducts inspected for proper insulation & air leakage/ damage				
	Return air grilles inspected and not blocked by books, cabinets, etc.				
	Is building heat supported by steam or a hot water boiler?				
	If temperature sensors are present, what is hot water supply temp? What is hot water return temp?				
	Is domestic hot water heater set to lowest possible setting (105°F-110°F) for general purpose?				
	Is the domestic water heater insulated properly? Could it benefit from wrapping an insulation blanket around it?				
	Mechanical rooms clean & not used for storage				
	Refrigerant leaks inspected on refrigeration equipment				
	Are chilled water, steam, and hot water piping insulated?				

Item	Check Point Description	Yes	No	N/A	Comments / Additional Information
	Building Operator Questions: Is the building FCS controlled?				
	Are fans or portable electric space heaters used by occupants?				Location/ Type
	What do you hear most often regarding this building's heating/cooling & comfort				
	Air handling units turned off when bldg is not occupied?				
18	Do you have large (>10HP) fans or motors operating in this building? Are VFDs an option?				
	List **operating schedules** of the following pieces of equipment: Fans: Chillers: Boilers: Motors (>10 HP):				List **actual schedules** of the following pieces of equipment (FCS trends): Fans: Chillers: Boilers: Motors (>10 HP):

Item	Check Point Description	Yes	No	N/A	Comments / Additional Information
19	General Comments / Concerns				

Water

Item	Check Point Description	Yes	No	N/A	Comments / Additional Information
	Are water meter(s) installed on building?				
	Cooling towers inspected for water leaks and or damage				
	Are there any leaks from faucets, toilets, urinals or other equipment?				Location
	Are there any leaks on HVAC piping (pumps, steam lines, etc.)				Location
	Are bathroom fixtures low flow? Toilet (1.6 gpf): Urinal (1.0 gpf): Faucet (2.0 gpm): Shower (2.5 gpm):				
	Building Operator Questions: Is there any process water usage in this building (DI, RO, other)?				Location, Type
	Is a re-circulating pump installed on the domestic hot water system? If so, is it on a timer?				
	Is there any once through cooling in this building?				Location, Type

	List major water consuming equipment in building:				
	Recommendations on potential energy reduction issues and value of continuing assessments into future years:				
	Recycling Program Does the building have clearly labeled recycling bins? If so, what kind: (please circle) Broken Glass Disposal White paper only Aluminum cans/ bottles Plastic cans/ bottles				

	Other: